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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

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239-240

Dated 15 January 1869.

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Works Department, 15th January 1869.

Read the following papers :—

No. 239. From the Superintending Engineer, 8th Division, to the Secretary to Government, Public Works Department, dated Madura, 18th September 1868, No. 1,424.

1. I have the honor to forward, for the information of Government, a very interesting report (with sketch plan) on the remains of an ancient lake, situated about twelve miles west of the station of Kodikanel, on the Pulney Hills.

1 Report.
1 Sketch Plan.

2. It was after a conversation with His Excellency Lord Napier that I requested Captain Prendergast to make a survey, and report on this site, where, in event of Government wishing to make a new Hill Station for troops, or a Sanitarium, or place where Europeans might settle down, there is a spot hardly equalled in any of the Hill Stations in India.

3. There are the remains of a bund on the north side, which was about ninety feet high, and all round the hills, where the lake must have been, a clearly defined water line is seen, which has eaten its way in some places several feet into the sides of the hills, and I have no doubt the lake must have contained water for years. The relative height of this water-mark is fifty feet above the bed of the stream at the breached bund.

4. On the south side there is a swamp at fifty-seven feet above the bed of stream at breach, which drains down on both ways. On the south a small stream towards the valley of Bodynaickenoor, and the north side it runs in a very tortuous course towards the bund.

5. I have no doubt that the bund was originally made by the Bodynaickenoor people, to turn the water to the south into their valley, instead of to the north, as it naturally runs. In the next valley of Fort Hamilton, the same thing occurs on a [illegible] scale, where there is a bund which sends the water down to the south, and [illegible] was cut last year by the inhabitants of Poombarray to turn the water down to their village.

6. As shown by Captain Prendergast, this is a noble site for a Hill Station. Fine undulating grass land, plenty of water, sholahs within two and three miles, and an easy system of drainage available down perpendicular cliffs with above 2,000 feet fall on eastern side of the lake into the valley of Bodynaickenoor.

Height above the sea, about 7,000 feet.

7. There would also be sufficient water should the lake be restored with the object of making a reservoir to irrigate at least 8,000 acres in the Bodynaickenoor valley, which at Rupees 5 an acre would give a yearly revenue of 40,000 Rupees.

From Captain H. L. PRENDERGAST, R. E., Executive Engineer, to the Superintending Engineer, 8th Division, dated Kodikanel, 14th September 1868.

1. With reference to your letter No. 1,162, of the 7th August 1868, I have t[illegible] honor to forward a sketch plan of the valley of the ancient lake, twelve miles fr[illegible] Kodikanel. There is no record or even current tradition regarding the form[illegible] existence of this lake, which appears to have been discovered by Colonel D. Hamilto[illegible]

some seven years ago; but the water-line, distinctly conspicuous at many places round the windings of the valley, shows that there was formerly an extensive reservoir.

2. The bund of the lake is at the northern extremity of the valley, its length is about 200 yards, and the breach at top is not quite 1[illegible] yards in width. The height of the bund, as taken accurately by the levelling instrument, was $89\frac{1}{2}$ feet above the bank of the stream, or $93\frac{1}{2}$ feet above its rocky bed. Lieutenant Hamilton considers it probable, that from the water-line not being observable on the un-breached portion of the spur or bund, the water of the lake sapping into the hill caused a land-slip, and the consequent destruction of the lake. My own impression is, that, judging by the conformation of the valley both above and below the bund, the stream had naturally an exit in its present channel; and that the cavities in the hill side, at each extremity of the bund, point unmistakably to artificial excavations, all the soil having been removed in an irregular manner, till the hard rock was arrived at. I cannot trace any signs of a land-slip so extensive as to have formed the whole of the barrier on either side, and the fact of the water-line not being traceable, does not appear to me to be a proof that the barrier was not standing in support of the water of the lake, for there are many other parts of the border where the water-line is completely effaced. The appearance of the rock on the side of the breach leads me to infer that the spur occupies its original position, there having been a contracted passage for the issue of the stream, and that this passage was closed, and the top raised and levelled for the purpose of forming a lake.

3. As the top of the bund is forty feet above the water-line, the water must, after a time, have undermined the embankment, and swept it away. No sudden accession of water could have caused the lake surface to overtop the bank, for the outlet for surplus water at the southern end of the lake is at present only seven and a half feet above the water-line, and as there is a deposit of black soil at the ridge, the level of escape in former times was possibly several feet lower.

4. The ridge is situated in a narrow valley, within three hundred yards of the precipice into the Bodynaickenoor valley, and a small swamp is found on a short space of flat bed; the one stream thence falls very rapidly to the south, and the other, more gently, towards the bed of the lake. I took levels from this ridge* downwards to the nearest point where the water-line was plainly seen, and checked the latter by taking also the water-line on the opposite side of the valley; as these two points agreed, I assumed that similar evidences of the water-mark at other parts of the lake must be on the one uniform level, and thus obtained the water level on the bund, without the trouble of levelling all along the course of the lake.

* Marked on the plan by a double arrow head.

5. The level of the water-line on the bund is $49\frac{1}{2}$ feet above the bank of the stream: there is, therefore, a fall of fifty-seven feet in the whole distance from the ridge. Again, within a mile from the ridge, the bank is $17\frac{1}{2}$ feet below the water-line, so that the fall from thence to the deepest part of the bed (*i. e.*, at the bund) is thirty-two feet. The point where this difference of level was taken, is at the upper end of the reach that runs from east to west; and the distance to the bund, measured in two lines, first to west and then to north, across the map, is about two and a quarter miles; but the stream takes a very tortuous course through the valley, and the length of its windings between the same points is four and one-third miles, so that the average fall is at about seven and a half feet a mile.

sloping banks at the sides. Thus there are fifty-three million cubic yards of supply to make good the discharge of thirty-three millions.

8. The lake stream is one of the small tributaries of the Amaravutty* river, the main source of which is in the Travancore country to the west, and is recognized on the Ordnance Map as passing by Kujeenad; the drainage area of the lake, thirty square-miles, is quite insignificant as compared with the extent of hill country that drains into the Amaravutty; and there is only one small patch of cultivation in the village of Manavanoor, measuring 500* acres, that can be said to be dependent (and in reality but partially so) on the lake stream. If the lake were restored, the people of Manavanoor would have a claim to a sluice in the bund for the irrigation of their fields; and allowing them the full share of water for a crop of paddy, at 6,000 cubic yards per acre, provision would be required for the discharge of three million cubic yards in the season, at the northern end of the lake. There is shown above to be fifty-three million cubic yards of water supply, and deducting three millions for Manavanoor, there remains fifty millions available for irrigation in the Cumbum valley, or sufficient for 8,300 acres of paddy land. The level of the lake will, during the cultivating season, never be lowered more than seven and a half feet, while an excessive influx‡ of water may either be retained in the lake, or discharged into the valley to the south.

* This flows into the Cauvery.

* The actual measurement has not been received from the Tahsildar; and a round number is taken, probably in excess of the actual figure.

‡ *i. e.*, from heavy rains.

9. The most conspicuous point round the basin of the lake is the Chundanoor hill, (marked on the Atlas Sheet, No. 62,) of the south-west extremity, and within a mile, as the crow flies, from the ridge. The summit of this hill is 7,400 feet bove the sea, and this being 400 or 500 feet above the valley, the slopes bordering the lake are at an elevation of just about 7,000 feet. About the lake there is certainly a most attractive site for a European settlement, or Military Sanitarium, the small knolls and spurs gradually sloping down to the water-line, are delightfully situated for detached bungalows with gardens in the intervening valleys, while the larger ridges on the east side of the lake would, on the top and slopes, give space for considerable Barrack accommodation. The first essential, water, is at hand in abundance, and of the best quality; wood for fuel is scarcely to be seen from the lake valley, but on looking down northwards, from the Chundanoor hill, there is seen a large shola close below, and the slopes of the hills are in different directions covered with forest within two or three miles distance. Round the lake itself the air is most invigorating, the west wind, that of greatest prevalence, blowing over miles of grass-covered hills, and there being no deleterious influences from rank vegetation or forest. My tent having been carried by the coolies in a wrong direction, I was benighted, and obliged to pass a night in the open, but without feeling the slightest bad effect. The thermometer at night falls below 50°, in the day-time stands between 60° and 65°.

10. If it were determined to locate a wing of a British Regiment at this place, and to establish also a Convalescent Depôt, the number of troops being, say, 700, and allowing for Officers, casual visitors, &c., 100 more Europeans, or alto-

6. The surface area of the lake, when filled to the level of the old water-line, is six and a quarter square-miles, and the cubical content is approximately 147 million cubic yards. There is no reliable record of rain-fall on the Pulney Hills, but considering the average fall in other hilly parts, I assume the yearly fall to be seventy-two inches. The catchment basin is about $29\frac{3}{4}$ square-miles, and the volume of water poured down is therefore 184,307,200 cubic yards. The sides of the hills sloping down into the bed of the lake are nowhere precipitous, and are covered with grass, springing from the black soil that, covering the high ground very scantily, increases to a depth of a yard or two yards in the valleys. All the smaller rills run through this soft soil, which low down in their course forms a bog, and they none of them have had erosive force sufficient to wear down to the rock; hence I conclude that the discharge of rain into the valley is not rapid, and as, during the south-west monsoon, there is a great deal of Scotch mist, rather than heavy showers, I take one-half of the rain-fall, or 92,153,600 cubic yards, as the available store of water. Thus the rain-fall of about one year and a half is required to fill the lake to its former height.

7. The period of rain-fall is principally between June and December, there being a break between the two monsoons in September and part of October; the early part of the year is the most dry, and showers fall again in April and May.

Supposing the lake to be filled to the water-line by the north-east monsoon, then, during the six months, January to June inclusive,

the evaporation amounts to ... ... 24,000,000 cubic yards.
at three-fourths of the total evaporation for the year; and
the storage by rain is ... ... 30,717,866 „
at one-third of the year's supply, so that the supply by rain is sufficient to maintain the water-level in the lake. The surface area of the lake is six and a quarter square-miles, and I assume that one-sixth inch is lost by evaporation per day, or about thirty-two million cubic yards in the year, then considering that there is usually a great deal of cloudy weather during the seasons of monsoon between July and December, and that there is bright sunshine chiefly in January to March and in June, three-fourths of the total loss by evaporation is calculated as being sustained in the first half of the year.

Again, with regard to the rain-fall, as the north-east monsoon sometimes brings rain late in January, and the south-west monsoon may also commence in June, I reckon that one-third of the rain-fall of the whole year comes down between 1st January and 1st July. In the latter half of the year there is

supply of water ... ... 61,435,734 cubic yards.
at two-thirds of the whole year's supply,
and loss by evaporation ... ... 8,000,000 „
at one-fourth of the annual loss.
Balance of water available ... ... 53,435,734 „

Now, with a view to utilizing the water of the lake for cultivation in the Cumbum valley, as well as to maintaining the water-level not much below its full depth, and supposing a sluice at the southern ridge that will lower the water seven and a half feet, the volume of water drained off to that depth will be 33,650,000 cubic yards; this volume being the cubical content of a surface layer cut off by a horizontal section, taken at seven and a half feet depth in the centre, and allowance being made for the

gether 800, taking further five Natives on average for each European, there would be an aggregate population of 5,000 people. Then, calculating the necessary water-supply at fifty gallons per head, per day, the annual consumption will be within 550,000 cubic yards, which is not one-hundredth part of the rain-fall stored during the year.

For bathing purposes no water need be raised for the soldiers, as floating baths, such as are common on the Rhine and other continental rivers, would afford the recreation of bathing at a much less cost to Government than pucka buildings adjoining the Barracks.

The climate is such that Europeans may be out in the open air all day long, and soldiers could indulge in all the out-door sports of their own country. Cricket, rackets, fives as played on the plains, as also hockey and foot-ball might give a variety to the amusements of the day; and, with the alternative of workshops and reading-rooms for rainy weather; and gardening, rowing on the lake, with walks of unlimited length and variety over the hills, in fine weather; the station ought to be one affording high enjoyment as well as benefit to the health of the soldier.

11. The site of the lake is known to only a few of the Natives residing on the hills. There is a pass from the head of the Bodynaickenoor valley, which leads to the village of Manavanoor, to the west of the basin; but the trade between Manavanoor and the plains is principally carried on by pack-bullocks and donkeys, along the ghaut from Pereacolum through Kodikanel. I have not reconnoitred the pass from Bodynaickenoor to see if that is a favorable line for a road, for the route by Kodikanel is much shorter, and it would be far less expensive to improve the Pereacolum Ghaut, than to lay out an entirely new trace on the other line.

MEMORANDUM.
No. 97.

1. As the condition of the ancient lake in the Pulney Hills is fully particularized in the foregoing reports, I would propose to confine my remarks to the general results of Captain Prendergast's survey of the locality.

2. The catchment basin of the tank is somewhat under thirty square-miles, and the total volume of water which would be obtained by a fall of seventy-two inches of rain over the whole area, would amount to 184 millions of cubic yards. The former capacity of the tank, which is well defined by a water-line still to be seen on both sides of the valley, is estimated at 147 millions of cubic yards. Captain Prendergast would not count on intercepting more than half the rain-fall, or ninety-two millions of cubic yards, so that the capacity of the tank is about one-half more than the quantity which would be likely to be available in the course of twelve months. He proposes to store the water permanently up to a certain level, by reserving a portion of the supply drained into the tank, after it is once filled, to make good the loss by evaporation; and by this arrangement the quantity to be used for irrigation would be reduced to fifty-three millions of cubic yards, of which fifty millions would be turned over the southern extremity of the tank into the Cumbum Valley, and the remaining three millions through the bund in the northern extremity towards the village of Manavanoor. The natural level of the ground at the south extremity is fifty-seven feet above that of the bed of the stream at the site of the old bund at the

northern end of the basin; the old water-line is forty-nine and a half feet above the same level. The permanent storage line, by Captain Prendergast's arrangement, would be nearly on the former level, and the additional thirty-three and a half millions would be obtained by raising the surface to the fifty-seven feet contour; it may therefore be assumed that the required quantity of fifty-three millions would be obtained at the sixty feet contour, or within a foot or two of it.

3. The object of Captain Prendergast's proposed arrangement for maintaining the water level at the minimum height of nearly fifty feet above the bed of the stream, at the site of the old bund, is two-fold. He could not otherwise obtain the water for the cultivators in the Cumbum Valley; for the tank once emptied, could not be filled again in a single season; and he besides lays stress on the inducement such a lake would offer for the formation of an European settlement in one of the most elevated and attractive sites to be found in Southern India.

4. Looking, however, at the question in connection with the interests of irrigation only, I do not see any valid reason for holding the water up for the benefit of the cultivators of the Cumbum Valley. The natural course of the stream leading through the old tank is towards the Amaravutty, and the cultivators along the latter have the first claim for the use of the water. Moreover, the supply of the numerous channels which are led off from that river is very deficient, and large remissions of revenue have frequently to be made in consequence. There would also be an absolute waste of water by the proposed plan of maintaining the surface at a high minimum level. But whatever decision may be arrived at on these points, the project would appear to be of a sufficiently promising character to justify the preparation of detailed plans and estimates for the restoration of the old bund, and for the construction of masonry works for the distribution and regulation of the water, and I would, therefore, recommend that instructions to that effect may be issued to the Superintending Engineer.

FORT ST. GEORGE,
23rd November 1868.

(Signed) J. C. ANDERSON, Colonel, R. E.,
Chief Engineer for Irrigation.

No. 240. ORDER THEREON, 15th January 1869, No. 117.

IRRIGATION, No. 18.

1. The Government have perused with much interest Captain Prendergast's report on the ancient lake discovered by Colonel Douglas Hamilton on the Pulney Hills.

2. In commenting on the results of Captain Prendergast's survey of the locality the Chief Engineer for Irrigation gives it as his opinion that, looking solely to the interests of irrigation, the restoration of the lake to serve as a reservoir for the retention of a large body of water is very desirable, and that, as there is no valid reason for permanently holding the water up to the level at which it seems to have been formerly maintained, the whole of it should be utilized. Colonel Anderson would therefore restore the Lake as a work of irrigation, and so construct its sluices as to be able to discharge, as may be necessary, the whole of its contents, which are estimated at 147 millions of cubic yards, while the rain-fall on the area drained into it is supposed to be only equal to 184 millions of cubic yards.

... the Madras Government, Public Works Department,
15th January 1869.

3. The Government do not concur with the Chief Engineer for Irrigation, as they are of opinion that the object of the undertaking should not be confined to the improvement of irrigation by the natural outlet towards the Amaravutty, but that the lake should be restored to its former dimensions, and that the surplus alone should be discharged into the Cumbum valley for the benefit of irrigation through an artificial cutting. His Excellency the Governor in Council accordingly directs that plans and estimates for carrying out the work with this object in view, may be prepared and submitted.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Chief Engineer for Irrigation.
,, Superintending Engineer, 8th Division.
,, Revenue Department.

Exd. S. T. Augustin.

PUBLIC WORKS

To

THE CHIEF ENGINEER FOR IRR

&c., &

Dated January, 15th.

Recd.

G. O., 15th January 1869, No.

JANUARY.

Nos. 239-240

Lake.—Passing orders on paper
tive to the ancient lake discover
Colonel Douglas Hamilton on the

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4. On the south side there is a swamp at fifty-seven feet above the bed of stream at breach, which drains down on both ways. On the south a small stream towards the valley of Bodynaickenoor, and the north side it runs in a very tortuous course towards the bund.

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6. As shown by Captain Prendergast, this is a noble site for a Hill Station. Fine undulating grass land, plenty of water, sholahs within two and three miles, and an easy system of drainage available down perpendicular cliffs with above 2,000 feet fall on eastern side of the lake into the valley of Bodynaickenoor.

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some seven years ago; but the water-line, distinctly conspicuous at many places round the windings of the valley, shows that there was formerly an extensive reservoir.

2. The bund of the lake is at the northern extremity of the valley, its length is about 200 yards, and the breach at top is not quite 100 yards in width. The height of the bund, as taken accurately by the levelling instrument, was 89½ feet above the bank of the stream, or 93½ feet above its rocky bed. Colonel Hamilton considers it probable, that from the water-line not being observable on the unbreached portion of the spur or bund, the water of the lake sapping into the hill caused a land-slip, and the consequent destruction of the lake. My own impression is, that, judging by the conformation of the valley both above and below the bund, the stream had naturally an exit in its present channel; and that the cavities in the hill side, at each extremity of the bund, point unmistakably to artificial excavations; all the soil having been removed in an irregular manner, till the hard rock was arrived at. I cannot trace any signs of a land-slip so extensive as to have formed the whole of the barrier on either side, and the fact of the water-line not being traceable, does not appear to me to be a proof that the barrier was not standing in support of the water of the lake, for there are many other parts of the border where the water-line is completely effaced. The appearance of the rock on the side of the breach leads me to infer that the spur occupies its original position, there having been a contracted passage for the issue of the stream, and that this passage was closed, and the top raised and levelled for the purpose of forming a lake.

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* Marked on the plan by a double arrow head.

5. The level of the water-line on the bund is 49½ feet above the bank of the stream: there is, therefore, a fall of fifty-seven feet in the whole distance from the ridge. Again, within a mile from the ridge, the bank is 17½ feet below the water-line, so that the fall from thence to the deepest part of the bed (*i. e.*, at the bund) is thirty-two feet. The point where this difference of level was taken, is at the upper end of the reach that runs from east to west; and the distance to the bund, measured in two lines, first to west and then to north, across the map, is about two and a quarter miles; but the stream takes a very tortuous course through the valley, and the

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* The actual measurement has not been received from the Tahsildar; and a round number is taken, probably in excess of the actual figure.

† *i. e.*, from heavy rains.

9. The most conspicuous point round the basin of the lake is the Chundanoor hill, (marked on the Atlas Sheet, No. 62,) at the south-west extremity, and within a mile, as the crow flies, from the ridge. The summit of this hill is 7,400 feet above the sea, and this being 400 or 500 feet above the valley, the slopes bordering the lake are at an elevation of just about 7,000 feet. About the lake there is certainly a most attractive site for a European settlement, or Military Sanitarium, the small knolls and spurs gradually sloping down to the water-line, are delightfully situated for detached bungalows with gardens in the intervening valleys, while the larger ridges on the east side of the lake would, on the top and slopes, give space for considerable Barrack accommodation. The first essential, water, is at hand in abundance, and of the best quality; wood for fuel is scarcely to be seen from the lake valley, but on looking down northwards, from the Chundanoor hill, there is seen a large shola close below, and the slopes of the hills are in different directions covered with forest within two or three miles distance. Round the lake itself the air is most invigorating, the west wind, that of greatest prevalence, blowing over miles of grass-covered hills, and there being no deleterious influences from rank vegetation or forest. My tent having been carried by the coolies in a wrong direction, I was benighted and obliged to pass a night in the open, but without feeling the slightest bad effect. The thermometer at night falls below 50°, and in the day-time stands between 60° and 65°.

10. If it were determined to locate a wing of a British Regiment at this place, and to establish also a Convalescent Depôt, the number of troops being, say, 700, and allowing for Officers, casual visitors, &c., 100 more Europeans, or altogether 800, taking further five Natives on average for each European, there would be an aggregate population of 5,000 people. Then, calculating the necessary water-supply at fifty gallons per head, per day, the annual consumption will be within 550,000 cubic yards, which is not one hundredth part of the rain-fall stored during the year.

For bathing purposes no water need be raised for the soldiers, as floating baths, such as are common on the Rhine and other continental rivers, would afford the recreation of bathing at a much less cost to Government than pucka buildings adjoining the Barracks.

The climate is such that Europeans may be out in the open air all day long, and soldiers could indulge in all the out-door-sports of their own country. Cricket, rackets, fives as played on the plains, as also hockey and foot-ball might give a variety to the amusements of the day; and, with the alternative of workshops and reading-rooms for rainy weather; and gardening, rowing on the lake, with walks of unlimited length and variety over the hills, in fine weather; the station ought to be one affording high enjoyment, as well as benefit to the health of the soldier.

11. The site of the lake is known to only a few of the Natives residing on the hills. There is a pass from the head of the Bodynaickenoor valley, which leads to the village of Manavanoor, to the west of the basin; but the trade between Manavanoor and the plains is principally carried on by pack-bullocks and donkeys, along the ghaut from Pereacolum through Kodikanel. I have not reconnoitred the pass from Bodynaickenoor to see if that is a favorable line for a road, for the route by Kodikanel is much shorter, and it would be far less expensive to improve the Pareacolum Ghaut, than to lay out an entirely new trace on the other line.

P.W. 4677/68.

Trans. Jany/69 to L 239. —

No 1424

15

Superintending Engrs Office
Madura 18th September/68

From

Colonel C. V. Wilkieson RE
Superintending Engineer
8th Division

To

Colonel C. A. Orr. RE
Secretary to Government
P. W. D.

Sir,

Enclo. 2
1 Report
1 Sketch plan

I have the honor to forward for the information of Government a very interesting report (with sketch plan) on the remains of an ancient Lake situated about 12 miles west of the Station of Kodakanal on the Pulney Hills.

2 It was after a conversation with His Excellency Lord Napier that I requested Captain Prendergast to make a survey

and report on this site, where in event of Government wishing to make a new hill Station for troops, or a Sanatarium, or place where Europeans might settle down, there is a Spot hardly equalled in any of the Hill Stations in India.

3 There are the remains of a bund on the northside which was about 90 feet high and all round the hills, where the lake must have been, a clearly defined water line is seen, which has eaten its way in some places several feet into the sides of the Hills and I have no doubt the lake must have contained water for years. The relative height of this watermark is 50 feet above the bed of the Stream at the breached bund.

4 On the South side there is a Swamp at 57 feet above the

bed of Stream at breach which drains down on both ways. On the South a small stream towards the valley of Bodinaickenoor and the northside it runs in a very tortuous course towards the bund

5 I have no doubt that the bund was originally made by the Bodinaickenoor people to turn the water to the South into their valley instead of to the north as it naturally runs. In the next valley of Fort Hamilton the same thing occurs on a small scale where there is a bund which sends the water down to the South and which was cut last year by the inhabitants of Poombarray to turn the water down to their village.

6. As shewn by Captain Prendergast this is a noble site for a Hill Station: Fine undulating grass land, plenty of water, Sholahs within 2 & 3 miles and an

t above the
ount 7000 feet

easy system of drainage available down perpendicular cliffs with above 2000 feet fall on eastern side of the lake into the valley of Bodinaicka-noor.

7 There would also be sufficient water should the lake be restored with object of making a reservoir to irrigate at least 8000 acres in the Bodinaickanoor valley which at Rs 5 an acre would give a yearly revenue of 40000 Rupees.

I have &ca

A. Wilson Colonel R.E.
Superintending Engr. 8 Dn.

191

P.W. 1868 Dept.

No. 1424

No. 3708.

From

The Superintending Engr.
8th Division

To

The Secretary to Govt.
P.W.D.

Dated 18th
Despd. 23rd
Recd. 25th
} September 1868

Rec. 19 Nov. 68

Enclo. 2

4047 p.

Submits with his opinion a report with plan from Captain Prendergast on an ancient lake situated about 12 miles west of Kodakanal on the Pulney Hills.

Pros. 15 Jany 69 No. 239

No. 97

As the Condition of the Ancient lake in the Puttoy Hills is fully particularized in the foregoing reports, I would propose to confine my remarks, to the general results of Captain Prendergast's Survey of the locality.

2 The catchment basin of the tank is somewhat under 30 square-miles, and the total volume of water which would be obtained by a fall of 72 inches of rain over the whole area would amount to 184 millions of Cubic yards. The former capacity of the Tank, which is well defined by a water-line still to be seen on both sides of the valley, is estimated at 147 millions of Cubic yards. Captain Prendergast would not count on intercepting more than half the rain fall, or 92 millions of Cubic yards, so that the capacity of the Tank is about one half more than the quantity which would be likely to be available in the course of twelve months. He proposes to store the water permanently up to a certain level, by

by reserving a portion of the supply drained into the Tank, after it is once filled, to make good the loss by evaporation; and by this arrangement the quantity to be used for irrigation, would be reduced to 53 millions of Cubic yards; of which 50 millions would be turned over the southern extremity of the Tank into the Cumbum Valley, and the remaining three millions through the bund in the northern extremity towards the village of Manavanoor. The natural level of the ground at the south extremity is 57 feet above that of the bed of the stream at the site of the old bund at the northern end of the basin; the old water-line is 49½ feet above the same level. The permanent storage line, by Captain Prendergast's arrangement would be nearly on the former level, and the additional 33½ millions would be obtained by raising the surface to the 57 feet Contour; it may therefore be assumed that the required quantity of 53 millions would be obtained at the 60 feet Contour; or within a foot or two of it

3 - The object of Captain Prendergast's

proposed

proposed arrangement for maintaining the water level, at the minimum height of nearly 50 feet above the bed of the stream at the site of the old bund, is twofold. He could not otherwise obtain the water for the Cultivators in the Cumbum valley; for the Tank once emptied, could not be filled again in a single season; and he besides lays stress on the inducement such a lake would offer for the formation of a European Settlement, in one of the most elevated and attractive sites to be found in Southern India

4 Looking however at the question in connection with the interests of irrigation only, I do not see any valid reason for holding the water up for the benefit of the Cultivators of the Cumbum valley. The natural course of the stream leading through the old Tank, is towards the Amaravutty, and the Cultivators along the latter have the first claim for the use of the water. Moreover the supply of the numerous Channels which are led off from that river is very deficient, and large remissions of revenue have frequently to be made in Consequence.

There

There would also be an absolute waste of water by the proposed plan of maintaining the surface at a high minimum level. But whatever decision may be arrived at on these points, the project would appear to be of a sufficiently promising character to justify the preparation of detailed plans and estimates, for the restoration of the old bund and for the construction of masonry works for the distribution and regulation of the water and I would therefore recommend that instructions to that effect may be issued to the Superintending Engineer

Fort St George
23rd November 1868

[signature] Colonel R.E.
Chief Engineer for Irrigation

To

The Secretary to Government
Public Works Department

P.W. 1868 Deptt.
Pro: of Govt. for January
No. 4677.

From
The Chief Engineer for
Irrigation

To
The Secretary to
Government P.W. Dept.

Dated 23rd } November 1868.
Recd. 1st }

No. 97

Enclosures. 4

Report on an ancient lake
in the Pulney Hills
8th Division ——

No. 117 – 15th Jany/69

No. 239

4th Decr 1868 Q. 1st

Kodikanal.
14th September 1868.

To,
The Superintending Engineer
8th Division

Sir,

With reference to your Letter No. 1162 of the 7th August 1868, I have the honor to forward a sketch plan of the valley of the ancient lake, 12 miles from Kodikanal. There is no record or even current tradition regarding the former existence of this lake, which appears to have been discovered by Colonel D. Hamilton some 7 years ago: but the water-line distinctly conspicuous at many places round the windings of the valley, shews that there was formerly an extensive reservoir.

2. The bund of the lake is at the Northern extremity of the valley; its length is about 200 yards: and the breach, at top is not quite 100 yards in width. The height of the bund, as taken accurately by the

levelling instrument, was $89\frac{1}{2}$ feet above the bank of the stream, or $93\frac{1}{2}$ feet above its rocky bed. Colonel Hamilton Considers it probable, that from the water-line not being observable on the unbreached portion of the spur or bund, the water of the lake sapping into the hill caused a land-slip, and the Consequent destruction of the lake. My own impression is, that, judging by the Conformation of the valley both above and below the bund, the stream had naturally an exit in its present Channel: and that the Cavities in the hill-side at each extremity of the band, point unmistakeably to artificial excavations: all the soil having been removed in an irregular manner till the hard rock was arrived at. I cannot trace any signs of a land-slip so extensive as to have formed the whole of the barrier on either side: and the fact of the water-line not being traceable, does not appear to me to be a proof that the barrier was not standing in support of the water of the lake.

lake: for there are many other parts of the border where the water-line is completely effaced. The appearance of the rock on the side of the breach, leads me to infer, that the spur occupies its original position there having been a contracted passage for the issue of the stream; and that this passage was closed, and the top raised and levelled, for the purpose of forming a lake.

3. As the top of the bund is 40 feet above the water-line, the water must after a time have undermined the embankment, and swept it away. No sudden accession of water, could have caused the lake surface to overtop the bank for the outlet for surplus water at the Southern end of the lake, is at present only 7½ feet above the water-line: and as there is a deposit of black soil at the ridge, the level of escape in former times, was possibly several feet lower.

4. The ridge is situated in a narrow valley within three hundred yards of the precipice into the Bodynackenoor valley, and a small swamp is found on the short space

of

of flat bed; the one stream, thence falls very rapidly to the south, and the other, more gently, towards the bed of the lake. I took levels from this ridge,* downwards, to the nearest point where the water-line was plainly seen, and checked the latter by taking also the water-line on the opposite side of the valley, as these two points agreed I assumed that similar evidences of the water-mark at other parts of the lake must be on the one uniform level, and thus obtained the water level on the bund, without the trouble of levelling all along the course of the lake.

* Marked on the plan by a double arrow head.

5. The level of the water-line on the bund, is 49½ feet above the bank of the stream; there is therefore a fall of 57 feet in the whole distance from the ridge: again within a mile from the ridge, the bank is 17½ feet below the water-line, so that the fall from thence to the deepest part of the bed (i.e. at the bund) is 32 feet. The point where this

last

last difference of level was taken, is at the upper end of the reach that runs from East to West; and the distance to the bend, - measured in two lines, first to West and then to North, across the map, is about 2[illegible] miles; but the stream takes a very tortuous course through the valley; and the length of its windings between the same points, is 4 3 miles, so that the average fall is about 7½ feet a mile.

6 The surface area of the lake, when filled to the level of the old water-line, is 6¼ square miles; and the Cubical Content is approximately 147 million Cubic yards. There is no reliable record of rain-fall on the Pulney hills; but Considering the average fall in other hilly parts, I assume the yearly fall to be 72 inches. The Catchment basin is about 29¾ square miles: and the volume of water poured down is therefore - 184. 307. 200 Cubic yards. The sides of the hills sloping down into the bed of the lake are no where precipitous, and are Covered with grass, springing from the black soil that

covering the high ground very scantily increases to a depth of a yard or 2 yards in the valleys. all the smaller rills run through this soft soil, which low down in their course forms a bog: and they none of them have had erosive force sufficient to wear down to the rock. hence I conclude that the discharge of rain into the valleys, is not rapid, and as during the S. W. monsoon; there is a great deal of Scotch mist, rather than heavy showers, I take one half of the rain-fall or 92.153.600 Cubic yards, as the available store of water. thus the rain-fall of about 1½ year is required to fill the lake to its former height. —

7. The period of rain-fall is principally between June and December; there being a break between the two monsoons in September and part of October; the early part of the year is the most dry, and showers fall again in April and May.

Supposing the lake to be filled to the water-

line

line, by the N. E. Monsoon: then during the six months, January to June inclusive, the evaporation amounts to 24.000.000 Cubic yards or three fourths of the total evaporation for the year: and the storage by rain is 30.717.866 — " — or $\frac{1}{3}$rd of the year's supply:

so that the supply by rain is sufficient to maintain the water-level in the lake. The surface area of the lake is $6\frac{1}{4}$ square miles: and I assume that $\frac{1}{6}$th inch is lost by evaporation per day, or about 32 million Cubic yards in the year; then Considering that there is usually a great deal of Cloudy weather during the seasons of monsoon between July and December; and that there is bright sunshine Chiefly in January to March, and in June: three-fourths of the total loss by evaporation is calculated as being sustained in the first half of the year. —

Again, with regard to the rain-fall, as the N. E. monsoon sometimes brings rain late in January; and the S. W. monsoon may also Commence in June; I reckon that one third

third of the rain-fall of the whole year comes down between 1st January and 1st July: In the latter half of the year: there is a

supply of water	61.433.734 Cubic yards
at 2/3rds of the whole years supply.	
and loss by evaporation	8.000.000 — "
at 1/4th of the annual loss.	
balance of water available	53.433.734 Cubic yds

Now, with a view to utilizing the water of the lake for cultivation in the Cumbum valley, as well as to maintaining the water-level not much below its full depth: and supposing a sluice at the Southern ridge, that will lower the water 7½ feet: the volume of water drained off to that depth will be 33.650.000 Cubic yards. This volume being the Cubical Content of a surface layer cut off by a horizontal section, taken at 7½ feet depth in the Centre; and allowance being made for the sloping banks at the sides. Thus there are 53 million Cubic yards of supply to make good the discharge of 33 millions.

8\. The lake stream is one of the smaller tributaries of the Amaravutty river: the main

This flows into the Cauvery

main source of which is in the Travancore Country to the West. and is recognized on the Ordnance Map. as passing by Kujeenad. the drainage area of the lake, 30 square miles, is quite insignificant as compared with the extent of hill Country that drains into the Amaravutty: and there is only one small patch of Cultivation in the village of Manavanoor, measuring 500* acres, that can be said to be dependent (and in reality but partially so) on the lake stream. If the lake were restored: the people of Manavanoor, would have a Claim to a sluice in the bund, for the irrigation of their fields; and allowing them the full share of water for a Crop of Paddy, at 6000 Cubic yards per acre; provision would be required for the discharge of 3 millions Cubic yards in the season; at the Northern end of the lake. There is shewn above, to be 53 millions Cubic yards of water supply, and deducting 3. millions for Manavanoor: there remain 50 millions available for irrigation in the

* The actual measurement has not been received from the Tahsildar; and a round number is taken, probably in excess of the actual figures.

the Cumbum valley, or sufficient for 8300 acres of paddy land. The level of the lake will, during the Cultivating season, never be lowered more than 7½ feet; while an excessive influx* of water, may either be retained in the lake, or discharged into the valley to the South.

* i.e. from heavy rains

9. The most Conspicuous point round the basin of the lake, is the Chundanoor hill, (marked on the Atlas sheet No. 62) at the S.W. extremity and within a mile, as the Crow flies, from the ridge. The summit of this hill is 7,400 feet above the sea: and this being 4 or 5 hundred feet above the valley; the slopes bordering the lake are at an elevation of just about 7000 feet. About the lake there is certainly a most attractive site for a European Settlement, or Military Sanitarium: the small knolls and spurs gradually sloping down to the water-line, are delightfully situated for detached bungalows with gardens in the intervening valleys: while the larger ridges on the East side of the lake, would on the top and slopes, give space for Considerable Barrack accommodation

10.

The first essential, water, is at hand, in abundance, and of the best quality: wood for fuel, is scarcely to be seen from the lake valley: but on looking down Northwards from the Chundanoor hill, there is seen a large shola Close below: and the slopes of the hills are in different directions Covered with forest, within 2 or 3 miles distance. Round the lake itself, the air is most invigorating, the West wind, that of greatest prevalence, blowing over miles of grass-Covered hills: and there being no deleterious influences from rank vegetation or forest. My tent having been Carried by the Coolies, in a wrong direction. I was be-nighted and obliged to pass a night in the open: but without feeling the slightest bad effect. The thermometer at night falls below 50°; and in the day-time stands between 60° and 65°.

10. If it were determined to locate a wing of a British Regiment, at this place, and to establish also a Convalescent

Depot

Depot: the number of troops being say 700, and allowing for Officers, Casual visitors, &c. 100 more Europeans: or altogether 800: taking further 5 natives on average for each European: there would be an aggregate population of 5,000 people. — Then calculating the necessary water-supply at 50 gallons per head per day: the annual Consumption will be within 550,000 Cubic yards: which is not one hundredth part of the rain-fall stored during the year. —

For bathing purposes, no water need be raised for the soldiers; as floating baths such as are Common on the Rhine, and other Continental rivers, would afford the recreation of bathing, at a much less Cost to Government, than pukka buildings adjoining the Barracks. —

The Climate is such that Europeans may be out in the open air all day long; and soldiers Could indulge in all the out-door sports of their own Country. Cricket, rackets, fives, as played on the plains, as

also

also Hockey and foot-ball might give
a variety to the amusements of the day;
and, with the alternative of work-shops
and reading-rooms, for rainy weather;
and gardening, rowing on the lake, with
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over the hills, in fine weather; the station
ought to be one affording high enjoyment,
as well as benefit to the health of the
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11 The site of the lake is known to
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pass from Bodynaickenoor, to see if
that is a favorable line for a road, for
the

the route by Kodikannel is much shorter and it would be far less expensive to improve the Paraeadum Ghaut, than to lay out an entirely new trace on the other line ---

I have &c.

(Signed) H. L. Prendergast Captain
Executive Engineer

(True Copy)

A. W. Wilson Colonel R.E.
Superintending Engineer
8th Division

No. 1 Enclosure in a
letter. No. 1424 dated
18th September 1868
From
The Supg Engineer
8th Division
To
The Secretary to Govt.
P.W.D.

PW ~~5708~~ 4677/68

Copy of a report from
Captain Prendergast
on an Ancient lake
situated about 12
miles west of Koda-
-kanal on the Pulney
Hills.

Trev. 15 Jany 69 L. L. 239.

Public Works Department

No 117 | 117

63

Proceedings of the Madras Government

Under date the 15th Jany 1869

Read the following

From The Chief Engineer for Irrigation. } | H. E. No 97 dated 23d Novr /68 |

The Government have perused with much interest Capt. Prendergast's report on the ancient Lake discovered by Col: Douglas Hamilton on the Pulney Hills.

In commenting on the results of Capt. Prendergast's survey of the locality, the Chief Engineer for Irrigation gives it as his opinion that, looking solely to the interests of irrigation, the restoration of the Lake

to

to serve as a reservoir for the retention of a large body of water is very desirable, and that as there is no valid reason for permanently holding the water up to the level at which it seems to have been formerly maintained, the whole of it should be utilized. Colle. Anderson would therefore restore the Lake as a work of irrigation, and so construct its sluices as to be able to discharge, as may be necessary, the whole of its contents, which are estimated at 147 millions of cubic yards, while the rain fall on the area drained into it is supposed to be

only equal to 184 millions of Cubic yards.

The Govt. do not concur with the Chief Engineer for Irrigation, as they are of opinion that the object of the undertaking should not be confined to the improvement of irrigation by the natural outlet towards the Ambravutty, but that the Lake should be restored to its former dimensions and that the surplus alone should be discharged into the Cumbum valley for the benefit of irrigation through an artificial cutting.

His Excellency the Governor in Council accordingly directs that plans and estimates for

Car-

carrying out the work
with this Object in view,
may be prepared and
Submitted.

[illegible]

46
—
4

To

3. The Chief Engr for Irrigation
6 " Supg Engr & Drs
21. " Rev: Depts

Despd 16th Jany/69 [illegible]

I would call for detailed plans and estimates. I cannot however be a particularly for the project in its larger form with the provision for the diversion of the water to the Cumbum valley by an artificial cut. I would only a primarily contemplate the improvement of the irrigation by the natural outlet towards the Amaravathy. N.

<u>For Orders.</u>

In forwarding the accompanying report by Captain Prendergast on the ancient Lake discovered by Colonel Douglas Hamilton on the Pulney Hills, the Chief Engineer for Irrigation gives it as his opinion that, looking solely to the interests of irrigation, the restoration of the Lake to serve as a reservoir for

A.P.S.

for the retention of a large reserve of water is very desirable, and that as there is no valid reason for permanently holding the water up to the level at which it seems to have been formerly maintained, the whole of it should be utilized. The natural outfall is towards the Amravutty, and the cultivators holding land under the, at present far from fully supplied channels from that river, appear to have the first claim to the water. Coll. Anderson would therefore

re-

The Sudr. Board, I think, adopt the views taken by Colonel Anderson who favor what seems no more than the natural rights of the cultivators on the Amravutty side. I doubt whether, compared with the probable cost of conveying the water into the Coimbatore valley, any very substantial benefits are very likely to be realized from colonizing the tank for the benefit of cultivation in that direction.

W.D.H.

41

restore the Lake as a work of Irrigation, and to construct its Sluices as to be able to discharge, as may be necessary, the whole of its contents, which are estimated at 147 millions of cubic yards, while the rain fall on the area drained into it is supposed to be only equal to 184 millions of cubic yards.

W.A.

(14)

C26477

L. Mar. 1868 Ca. 1/5

Cue 4677 [?]

Govt. of {1868} Madras.

PUBLIC WORKS.

To The Chief Engr. for Irrigation [?]

&c., &c., &c.

Dated

Recd. Encl.

G. O., 15th Jany 1869 No. 117.

Nos. 239 & 240

Lake. Passing [?] orders on papers relative to the ancient Lake discovered by Col. Douglas Hamilton on the Pulney hills, Madura [?] Dt.